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AN ASSESSMENT OF THE COST ACCOUNT ROLL-UP SYSTEM (CARU)

by

Joyce B. Jordan

December 1986

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The results of the study indicate that CARU is an effective information system. It does an excellent job of supporting the Productive Unit Resourcing System. CARU has the potential to excel as a decision-making tool for managers in matters of employee performance and financial accountability.

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An Assessment of The Cost Account Roll-up System (CARU)

by

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ABSTRACT

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LIST OF ABBREVIATIONS

ASO ----- Aviation Supply Office

CARU ---- Cost Account Roll-Up System

JON ----- Job Order Number

NAVSUP -- Naval Supply Systems Command

NPFC ---- Naval Publications and Forms Center

NSC ----- Naval Supply Center

O&MN ---- Operations and Maintenance, Navy

PURS ---- Productive Unit Resourcing System

SPCC ---- Ships Parts Control Center

UMR ----- Uniform Management Report

I. INTRODUCTION

The Cost Account Roll-Up (CARU) System is a computer-based information system designed primarily to enhance management capabilities under the Productive Unit Resourcing System (defined below). It was developed at the Naval Supply Center, Charleston, South Carolina with the consent of Naval Supply Systems Command (NAVSUP). CARU provides accurate, real time labor distribution data which are essential for effective management under the Productive Unit Resourcing System but are not available elsewhere in a consolidated, readily accessible format. [Ref. 1] The way CARU operates is to record labor costs at the individual employee level and to roll these costs up to successively higher levels, i.e., job order, cost account and program. The system also has the capability to provide productivity and quality control information from the individual level up to the program level. CARU is defined by its developers as a management and financial system that:

1. encourages macro mananagement by field activities and headquarters (NAVSUP);
2. is timely;
3. is accurate;
4. provides a review of activity funds execution as budgeted, in the rate format;
5. encourages competency in employment and personal accountability;

6. accomodates changing management styles; and

7. provides to headquarters a bottom-line accounting system for activity analysis and comparison. [Ref. 2]

The Productive Unit Resourcing System (PURS) is a relatively new NAVSUP funding strategy initially implemented to fund the physical distribution function at Naval Supply Centers (NSCs). The basic concept is to provide funds for a planned workload at a specified rate per unit of work accomplished. Activities are given incentives to accomplish the work at less than that rate. The strategy is based upon the premise that an activity should be funded for work produced, not for fixed staffing and non-labor costs. [Ref. 3] PURS will be defined in more detail later in the study.

In FY 1986 PURS was expanded to include procurement. In FY 1987 the program will be further expanded to include inventory control and ADP. [Ref. 4] PURS is in place at the eight NSCs, Aviation Supply Office (ASO), Ships Parts Control Center (SPCC), Naval Publications and Forms Center (NPFC),the Navy Regional Finance Center (Washington, D. C.), and the four Naval Regional Contracting Centers. [Ref. 5:pp. 1]

This study explores the potential of CARU to impact positively on the ability of NAVSUP managers to improve productivity under PURS.

A. OBJECTIVES OF THE RESEARCH

The objectives of this research effort are to present the provisions of CARU and to assess its effectiveness as an information system. The research attempts to answer such questions as :

1. What is the impetus behind the development of the CARU System?
2. Is CARU a dynamic system? Can it change or grow to meet the changing need of managers?
3. What costs are involved in implementing the system, and who will bear those costs?

B. SCOPE AND LIMITATIONS OF THE STUDY

The CARU System was designed for use at NAVSUP field activities. This study focuses on the application of the system at those activities. Because the system is still in the prototype stage, its usage has been limited to operation at NSC, Charleston, South Carolina.

C. RESEARCH METHODOLOGY

The research for this study consisted of an in-depth review of the CARU prototype at NSC Charleston. Personal interviews with system developers and major users were the major sources of information. Appendix A is a list of interview questions that were used to structure interviews with the actual users of CARU. Personal interviews were conducted at NSC Oakland, California, with the Comptroller and Deputy Comptroller. NSC Oakland plans to implement the

CARU System once it is available for use outside NSC Charleston. A literature review of management systems and management information systems was also conducted in order to provide a frame of reference for the study.

The information collected was then used to do the following:

1. Examine the provisions of CARU against the criteria of its stated objectives.
2. Assess the usefulness of CARU according to its major users.
3. Identify CARU shortcomings.
4. Explore the feasibility of expanding the use of CARU to other commands and for other uses.

D. ORGANIZATION OF THE STUDY

Chapter II presents the framework and background data to provide a setting for CARU. Chapter III sets forth the objectives and procedures of CARU. Chapter IV is an evaluation of CARU, assessing its effectiveness as an information system. Chapter V examines alteratives to the system, other applications, and exportability. Chapter VI presents final conclusions and recommendations.

II. FRAMEWORK FOR CARU

The prototype for CARU was placed in operation at NSC Charleston in FY 1986. [Ref. 4] The system provides the closest thing to real-time labor distribution data currently available. It provides information in a format that is consistent with the manner in which field activities are budgeted under PURS. CARU has the capability to provide quality control information and productivity data for management purposes. It also provides a simplified UMR (Uniform Management Report) type report which greatly reduces the amount of detail reported to NAVSUP headquarters. [Ref. 1]

The following paragraphs provide some background into the events leading up to the development of CARU.

A. PURS

CARU is basically a support system for PURS, although it has far more applications than just that. PURS (sometimes referred to as "rate resourcing"). is a recently developed budgeting and funding strategy in effect at selected NAVSUP field activities. The strategy was initiated in FY 1985 to fund civilian labor performing physical distribution operations at the NSCs. It was designed to reduce expenses through a more efficient use of the workforce. [Ref. 3] Actual dollar savings realized are then rebated to qualifying activities on a "share" basis with NAVSUP. PURS applies to O&M,N funds only. Operation under PURS requires:

> . . . the control of a flexible workforce that can accomodate changes in workload at lowest cost--i.e., staffing to minimum workload and bringing in temporary/intermittent employees to meet surges. This requires daily workload forecasting and a short-fuzed labor pool capability. It also means the Corporation Headquarters (NAVSUP) must respond immediately with resources necessary to pay for workload growth and other changing conditions not under control of the NSCs. [Ref. 3]

There is an implicit assumption here that labor costs are essentially variable costs. That is, the workforce can be increased or decreased at will to the level necessary to handle a growing or shrinking workload. In actuality, activities find that the workload manifests itself in valleys and peaks. The objective becomes to maintain sufficient staff to handle the valleys and utilize temporary and intermittents for peak workload. [Ref. 6]

As a result of implementing PURS, NAVSUP has been able to fund significant workload growth at five of its supply centers without an increase in NAVSUP's overall resources for those activities. Savings have resulted primarily from use of less expensive labor (temporary and intermittent employees). [Ref. 3]

1. Traditional Funding Method Versus PURS

Traditionally, NSCs and other activities were funded for civilian labor on the basis of authorized end strength. Regardless of workload changes, the activity would be funded based upon a given number of work-years. Under PURS:

> . . . NAVSUP commits to fund workload at the required level of performance, i.e., field activities will be funded on the basis of actual work performed vice the fixed workyear/cost funding methodology used previously. [Ref. 5:p. 1]

In effect, NAVSUP pays participating activities for work actually done on a "productive unit" basis. A productive unit is a unit of output (work) that is measurable and verifiable. NAVSUP divides its field activities into cost centers for funding purposes. Each cost center is then assigned a productive unit for measurement of work accomplished. In CARU, and for the purposes of this study, a productive unit will be called a "work unit" and a cost center will be called a program. [Ref. 7:pp.A-4] A work unit at the Physical Distribution Program level is a movement unit. A movement unit is defined as a line item issued, received, inducted, or returned to storage. Appendix B is a list of existing programs (cost centers) and associated work units (productive units).

Field activities are funded at a negotiated "productive unit rate" (hereafter referred to as "rate") for a planned workload. A rate will be defined as the cost for producing one work unit. The "negotiated rate" is the "price" NAVSUP will pay for the production of one work unit. Rates are determined through an interactive negotiation process between each field activity and NAVSUP Headquarters. Rates will normally vary between activities. [Ref. 5:pp. 2-3] Different rates are established for each program.

The basis for rate determination is to divide the number of projected work units (associated with the planned workload) into the estimated direct cost, both labor and non-labor, of resources required to accomplish the planned workload. Direct costs include both fixed and variable elements. Rate determination can become a very complicated process, depending on how the work unit is defined and what tradeoffs have to be made between the activity and NAVSUP in order to stay within available NAVSUP resources. Appendix C illustrates how a specific program (cost center) is defined, the associated work (productive) units and the basis for rate determination for that program. Because a considerable portion of direct costs might consist of fixed costs, the rate must be re-evaluated if the workload changes significantly.

2. Profit Sharing

Profit sharing is designed to provide activities with the incentive to reduce labor costs through increased productivity and better management of the civilian workforce. It is the sharing of activity savings under PURS. A percentage of actual dollar savings are retained by the activity for use as desired by the Commanding Officer. Recommended uses for the funds include incentive awards, habitability improvements, etc. Savings are generated by programs which "beat the rate" (produce work units at less than the negotiated rate) and thereby free dollars for other uses. Funding is also reduced for those programs whose workload is less than planned. On the negative side, programs whose actual rate is greater than the negotiated rate must absorb the increased cost from elsewhere in the activity operating budget. NAVSUP's share of any savings are used to pay for workload growth or to undertake productivity initiatives. The profit sharing ratio is determined by NAVSUP prior to the beginning of the fiscal year. [Ref. 3]

To participate in profit sharing, a program must first achieve an actual rate that is less than the negotiated rate. The program must then meet quality goals as defined by quality indicators. A quality indicator is defined as a performance level which must be met or exceeded in order for a program to qualify for profit sharing. For example, the physical distribution program has seven indicators such as "point of entry effectiveness" and "warehouse refusals". Goals for these indicators are established by NAVSUP. Failure to meet established goals in any two areas in one quarter or failure to meet established goals in the same indicator for two consecutive quarters will result in no profit sharing for the physical distribution program. [Ref. 5:pp. 5-6] Paragraph 3 of Appendix C gives a second example of quality indicators.

3. Responsibilities Under PURS

Under PURS, NAVSUP commits to fund activities on the basis of actual workload. The activity is expected to minimize the unit cost of processing actual work. Supervisors will be held accountable for the organizational and program performance against the negotiated rate, as well as cost reduction targets and productivity improvements. [Ref. 5:pp. 6-7]

The supervisor, or Program Manager is expected to perform such activities as the following:

-Track planned vs actual workload and rates

-Extrapolate future workload

-Monitor quality indicators

-Monitor backlogs

-Review overhead costs

-Interface with comptroller concerning proposed rates

-Attend rate negotiations

-Review productivity enhancements [Ref. 5:p. 7]

B. DEVELOPMENT OF CARU

In FY85 NAVSUP initiated a new method of budgeting called PURS. Recognizing the need for an information system to support PURS and other management needs at the local activity level, NSC Charleston requested and received permission from NAVSUP in FY85 to attempt development of an information system to support those needs. The resulting system was called the Cost Account Roll-Up (CARU) System because of the way labor costs are recorded at the individual employee level by job order and summarized up to the cost account, program and activity levels. The system prototype was placed in operation at NSC Charleston in FY86. [Ref. 7:p. 1]

C. PRESENTATION OF CARU TO OTHER ACTIVITIES

CARU was presented to the NAVSUP Executive Board on 28 May 1986. The briefing was well received and NSC Charleston was directed by Commander, NAVSUP to provide an on-site presentation to other NAVSUP field activities. The briefing was conducted in July 1986, with the ultimate objective of enabling attendants to have a similiar capability and ensuring that the data base for management reports is the same throughout the field. A list of attendees is provided in Appendix D. CARU was well accepted by most of the other field activities. [Ref. 1]

NSC Puget Sound is first in line to receive the system once it is available for export to other activities.

D. CARU FROM AN INFORMATION SYSTEM PESPECTIVE

1. Definition

For the purpose of this study an information system is defined as a system which will provide that information which is necessary to support the decision making and control functions in an organization. Information is defined as data transformed into a format which is not only meaningful to the user but of real value in making current and future decisions. [Ref. 8:pp. 1-5] CARU provides information in the performance/control category. It basically answers the question of "How well are we doing?"

2. Information System Performance Criteria

According to some authorities, most information systems fail because too much emphasis is placed on technology and not enough on crucial organizational behavior problems and interrelationships. [Ref. 9:pp.1-5] Major problems cited are as follows:

-Users don't understand the output they receive.

-Changes are made to the system without consulting the users.

-The system produces much more data than can reasonably be utilized.

-It is difficult to obtain changes to an existing system.

-The intended users of the system don't use the information because it doesn't meet their needs or because of perceived inaccuracies.

With these problems in mind, CARU was evaluated in this study against the following seven performance criteria. These criteria are borrowed from Krauss' performance planning criteria for designing an MIS. [Ref. 10:pp. 102-104]

(1) RELEVANCE - Does the system address the problems at hand? Does it meet the needs of the users/is the output easily understood? Will it assist the user in meeting stated objectives?

(2) USER RESPONSIVENESS - Is the system flexible? Does it allow for program changes? Is it difficult for users to make changes to the system?

(3) ACCESSIBILITY - Is the system easy to use? Is there a realistic turnaround time? Is the system nearby/convenient to use?

(4) DEPENDABILITY - Does the system perform as specified? Does the system work most of the time?

(5) SECURITY - Is sensitive information protected from view and/or alteration by unauthorized personnel?

(6) ACCURACY - Is the output precise enough for its intended use?

(7) EFFICIENCY - Is the operating cost reasonable?

E. SUMMARY

Chapter II is a brief history of the origin of CARU. Background information on PURS is provided in an attempt to show its influence on CARU's development. PURS establishes the basic environment in which CARU operates. CARU is also presented as an information system, with some discussion of what causes information systems to fail. The seven criteria against which CARU is evaluated in this study are listed, with a brief explanation of each.

III. CARU PROVISIONS

A. OBJECTIVES

CARU was conceived and developed out of a need to do several things. Foremost was the need for an information system to support PURS. A second need was for timely, accurate financial and employee performance data at all management levels. Thirdly, there was a desire to influence NAVSUP toward a position of macro management of field activities instead of micro management. [Ref. 6]

The objectives of CARU are as follow:

- Provide a management system which gives headquarters less detail, but what they need to manage.
- Provide a management system that gives financial data to managers at activity levels which allow them to effectively monitor rate resourcing.
- Provide management with a system which will monitor individual and group productivity and quality performance.
- Provide a system which is flexible enough to accomodate different managing styles. [Ref. 7:p. 2]

B. HOW IT WORKS

The major purpose of CARU is to provide an automated means of recording labor distribution data on a daily basis. Non-labor data are summarized into the system with each Journal Voucher, approximately three times a week. (Non-labor data are run on the Burroughs mainframe computer, as a part of an existing financial system, and downloaded to the CARU system at the job order level). These labor and non-labor data are then successively rolled up to the program level. The system also records work unit data at the employee, cost account and program levels. [Ref. 7:pp. 2-3] Employee and cost account work units are established for the use of activity managers. They are not rolled up to the program level to become program work units, which are established by NAVSUP in reference 5.

Formerly, labor and work unit data were recorded and reported via the Uniform Management Report (UMR) on a monthly basis. The UMR was not normally available for 15 to 20 days after the 30 day period covered. The information received was not of much use except from a historical perspective.

CARU operates from the premise that, if managers are expected to achieve increased productivity by the workforce and be held accountable for performance under PURS, they must have access to real time performance feedback on which to base their decisions. The mechanics of the system are discussed below.

1. Data Entry

Labor and work unit data are entered into the system via a CRT Screen. NSC Charleston has not found it necessary to hire additional employees to perform data entry. [Ref. 7:p. 8] In many cases this function is assigned as a collateral duty.

a. Individual Employees

Data entered for individual employees include the job order number(s), labor code(s) for each job order number, the number of hours expended against each job order number and the standard code and associated work units. The labor code is a two digit, alpha code designating the type of labor, such as overtime or regular hours. The standard code is a two digit alpha code designating an engineered standard which is used to monitor an employee's productivity. For example, if a warehouse worker issues 40 line items and the engineered standard is .0667 hours then 40 X .0667 = 2.67 hours earned by that worker. An example of an employee work unit within a branch of the physical distribution program is a line item issued. [Ref. 7:p. A-1]

These data are entered daily by a designated timekeeper. Data can be entered for one employee by calling up the employee's social security number. Alternatively, data can be entered for a group of employees within a division or branch by entering the code for the division or branch. For daily data entry the system offers the use of defaults for job orders and standard codes. This feature eliminates the need to enter the same data repetitively. [Refs. 4,11]

In some sections, data entry is rotated among employees to ensure any one employee is not overburdened. Users interviewed agreed that data entry is not any more time consuming than the system used previously for labor distribution. Supervisors generally agreed daily data entry is a lot better than waiting until the end of the pay period and trying to reconstruct what happened during the last two weeks for 20-30 employees. Although the recordkeeping appears to get very convoluted in some cases, basically the same data were maintained for other reporting requirements.

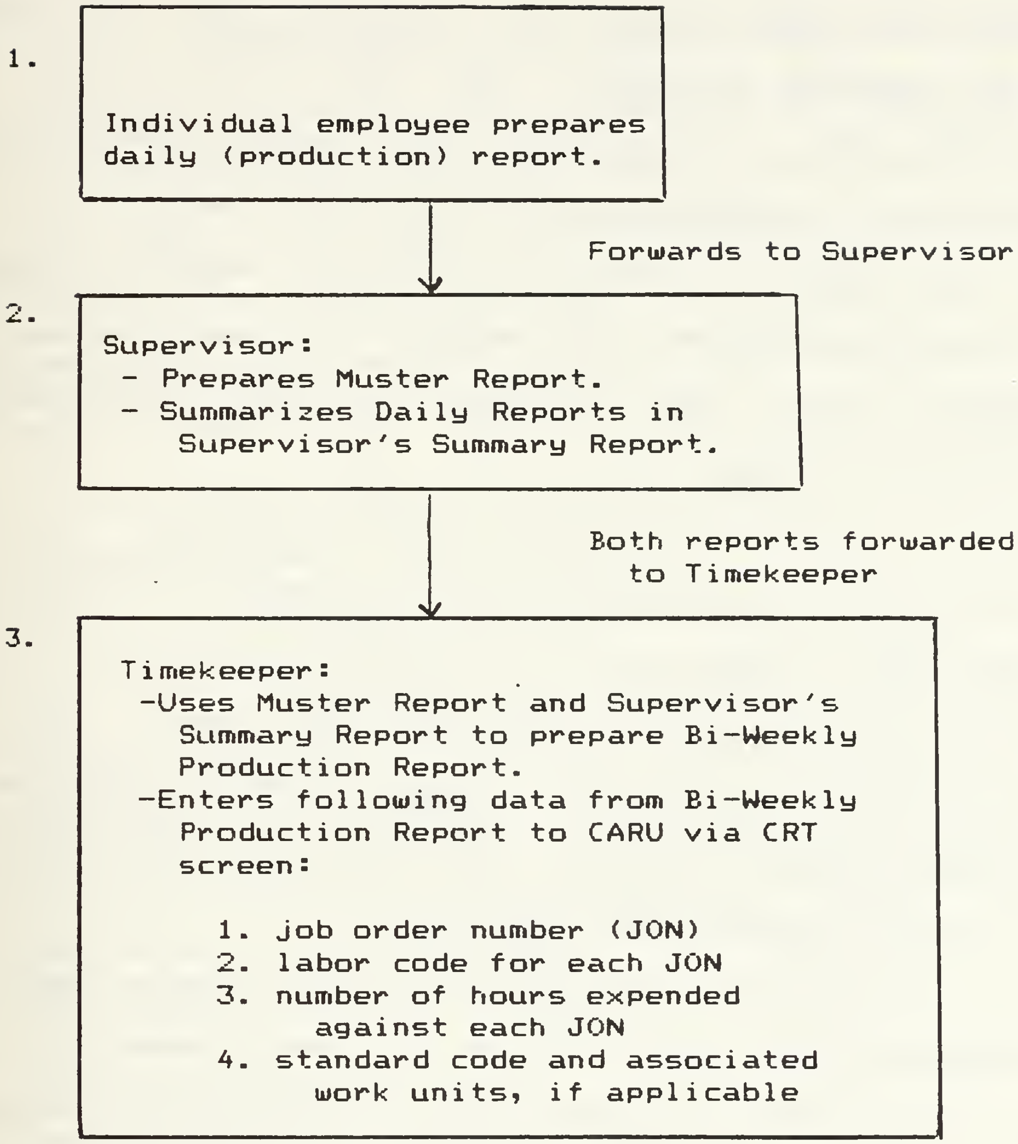
Figure 1 is an example of how one section accomplishes data entry. In this case the timekeeping function is a collateral duty rotated between two employees every two pay periods and is performed for eight employees. [Ref. 11]

b. Cost Account Work Units

A cost account is an alphanumerical designation of certain functions grouped together, such as 212E designating the shipping operation. Cost account work unit data are received via reports from responsible departments. An example of a cost account work unit in the physical distribution program might be a processed invoice. The recommended data entry frequency is monthly, but management is free to vary the frequency. At NSC Charleston, Code 54, Methods Engineering Division is responsible for entering these data. [Ref. 7:p. 3]

c. Program Work Units

A program is the grouping together of functions so that they can be budgeted as one unit. Programs can be



1. Individual employee prepares daily (production) report.

2. Supervisor:
- Prepares Muster Report.
- Summarizes Daily Reports in Supervisor's Summary Report.

3. Timekeeper:
- Uses Muster Report and Supervisor's Summary Report to prepare Bi-Weekly Production Report.
- Enters following data from Bi-Weekly Production Report to CARU via CRT screen:

1. job order number (JON)
2. labor code for each JON
3. number of hours expended against each JON
4. standard code and associated work units, if applicable

Source: [Ref.11]

Figure 1 Individual Data Entry Flow Process

made up of more than one cost account. Only those programs budgeted under PURS have work units assigned, and those work units are assigned by NAVSUP. [Ref. 7:pp. 3, A-3] The program work unit in the physical distribution program is a movement unit. A movement unit is an issue, receipt, induction or return of material to storage. Appendix B is a list of current programs (cost centers) and associated work (productive) units. NSC Charleston also treats reimbursables as a separate program.

At NSC Charleston, Code 54, Methods Engineering Division, is responsible for entering program work unit data. These data are provided to Code 54 via reports from the responsible department/cost center. The system is set up for daily data entry, but the frequency may vary at the option of the cost center manager. [Ref. 7:p. 3]

d. Net/Reimbursable Transfers

The user of the CARU system may transfer labor hours and associated costs from one job order number to another. This feature is used to move reimbursable labor and associated non-labor costs to a reimbursable cost account. The user may input the job order numbers, hours, dollar amount, acceleration amount and the division for the reimbursable or non-labor net transfers. At NSC Charleston this option is limited to selected personnel in Code 54. [Ref. 7:p. 3]

2. Output

System output in the form of reports is available on-line and in hard copy. Authorized personnel can access the information at any time. Reports are available as of the last date in which work unit data have been added to the system. The date of the report can be specified. On-line reports can be requested in daily, month-to-date or year-to-date format. Hard copy reports will be consolidated to display information in various formats, as will be discussed below. [Ref. 7:pp. 3-5]

a. Employee Performance Report

This report can be reviewed at the division, branch, warehouse, or individual employee level. For whatever level requested, each employee within that organizational level will be shown in social security number (EMPLOYEE'S ID NUMBER) sequence, from the lowest number to the highest, as shown in Table 1. For each employee a standard code(s) will appear (if applicable) beneath the employee's name. A standard code is a two letter symbol which represents an engineered standard which is used to monitor an employee's production effectiveness.

Work units, hours earned, hours available and production effectiveness are listed for each standard code. Employee totals are shown for all four categories on the same line as the employee's name. Work units are shown in day and month-to-date format. Hours earned are the number of work

TABLE 1

EMPLOYEE PERFORMANCE REPORT

```
    05/20/86                                       COST ACCOUNT ROLL-UP SYSTEM
                                     CODE 301 EMPLOYEE PERFORMANCE REPORT AS OF 05/15/86

EMPLOYEE'S                           WORK UNITS        HOURS EARNED              HOURS AVAILABLE       PRODUCTION EFFECTIVENESS
ID NUMBER   NAME                     DAY MONTH  YEAR   DAY   MONTH   YEAR   DAY   MONTH   YEAR      DAY    MONTH    YEAR
*********   ***************************  ****  ****   ****  *****  *****   *****  *****  ******  ******  ******  ******  ******

        AZ                           108   849   849   8.40  66.05   66.05  6.00  63.00   63.00  140.00  104.84  104.84
212746921   DREW JR         R         74   932   932  11.86 121.21  121.21  8.00  84.00   84.00  148.25  144.29  144.29
        AA                            40   697   697  15.38  93.81   93.81  3.00  62.00   62.00  179.33  151.30  151.30
        AH                             0   186   186   0.00  18.07   18.07  0.00  15.00   15.00    0.00  120.46  120.46
        AB                            34    49    49   6.48   9.33    9.33  5.00   7.00    7.00  129.60  133.28  133.28
230140347   FULLER          G          0     0     0   0.00   0.00    0.00  0.00   0.00    0.00    0.00    0.00    0.00
                                       0     0     0   0.00   0.00    0.00  0.00   0.00    0.00    0.00    0.00    0.00
238781408   MCPHAIL         W          0  2891  2891   0.00  93.83   93.83  0.00  80.00   80.00    0.00  117.28  117.28
        BH                             0  2871  2871   0.00  87.27   87.27  0.00  72.00   72.00    0.00  121.20  121.20
        AR                             0    20    20   0.00   6.56    6.56  0.00   8.00    8.00    0.00   82.00   82.00
243083962   WEBSTER         V         54   698   698   5.11  63.83   63.83  5.00  79.00   79.00  102.20   80.79   80.79
        CG                            54   547   547   5.11  51.85   51.85  5.00  71.00   71.00  102.20   73.02   73.02
        CF                             0   151   151   0.00  11.98   11.98  0.00   8.00    8.00    0.00  149.75  149.75
247380734   KING JR         S          0   504   504   0.00  14.72   14.72  0.00  27.00   27.00    0.00   54.51   54.51
        BH                             0   419   419   0.00  12.73   12.73  0.00  22.00   22.00    0.00   57.86   57.86
```

Source: Ref. 7

units completed by an individual multiplied by the engineered standard associated with that work unit. Hours earned are shown for the year-to-date, day and month-to-date. Hours available are the actual number of hours an employee works. The hours available are shown for the day, month-to-date, and year-to-date. Production effectiveness is expressed as a percentage obtained by dividing earned hours by available hours. This information is also shown for the day, month-to-date and year-to-date. [Ref. 7:pp. A-1,A-4]

b. Report of Job Orders

This report shows the labor costs and labor hours charged to each job order number. It can be called up by department, division, or branch. Job orders are listed numerically within their respective cost accounts (cost acct), which are listed in alphanumeric order. A corresponding program (prog) number is also listed. For example, program 01 represents the physical distribution program. Both labor costs and labor hours charged are shown in a daily, monthly, and yearly format as illustrated in Table 2. The TITLE column lists the name of the respective cost account. [Ref. 7:p. 4]

c. Report of Cost Accounts

This report can be called up by any of three organizational levels: department, division, or branch. All the cost accounts used within the organizational level requested will be listed with related labor and an associated

TABLE 2

JOB ORDER REPORT

```
                                                                COST ACCOUNT ROLL-UP SYSTEM
RUN DATE 05/20/86                                             JOB ORDER REPORT   AS OF   860430
                                                              CODE 101        -  REQUIREMENTS DIV

                                                       EXPENSES                                      HOURS
PROG COST ACCT    JOB ORDER  TITLE                      DAILY       MONTHLY       YEARLY            DAILY    MONTHLY   YEARLY

 01   A5 2120       62107    DT ISSUING NPD             0 00          0 00         236 56             0         0         10
 01   A5 2120       70114    ISSUING OPS D/L            0 00          0.00        7136 62             0         0        460
 01   A5 2120       70126    DIRECT LABOR             390 42       8120.16       40231.70            25       515       2579
 06   A5 2128       58506    LABOR SUBACS               0 00        273 28         273 28             0        16         16
 01   A5 2130       70119    D/L STORAGE OPS            0 00          0 00          62 72             0         0          4
 01   A5 2140       70123    DIRECT LABOR             436 60      12856.18       87358 28            27       723       4872
 01   A5 2140       70124    INDIRECT LABOR            55 60       1225.00        7896 60             2        44        290
 01   A5 2170       62100    DT REQUIRE DET             0.00          0 00        5216.00             0         0        193
 01   A5 2170       70100    D/L REQUIRE DET         4985.02     111100.00      698783 00           284      6162      38458
 01   A5 2170       70101    I/L REQUIRE DET          111.20       3535.90       22071 10             4       127        783
 07   D1 106X       70121    TRAINING                 743.12       4779 84       68189 28            30       258       3835
 00   D1 1RHO       70102    ANNUAL LEAVE             363.64      13445 42       86281.14            19       714       4643
 00   D1 1RHI       70103    SICK LEAVE               303.36       6651.76       48379 70            16       373       2689
 00   01 1RJO       70109    TERMINAL LEAVE             0 00          0 00       10644 48             0         0        448
 00   01 1RKO       70104    HOLIDAY LEAVE              0.00          0 00       51749 28             0         0       2848
 00   D1 1RLO       70105    ADMIN  LEAVE               0 00        704 44        3322 60             0        38        175
 00   D1 1RMO       70106    COMP. LEAVE                0 00          6 04        2085 48             0         0        101
 07   D1 1WOP       70160    LWOP                       0.00          0.00           0 00             0         4        735

                             TOTALS                  7388.98     162698.00     1139917 82           408      8976      63142
```

Source : Ref. 7

rate, non-labor and an associated rate, total costs and total work units completed. Work units and rates will be shown only for cost accounts that have the requested department assigned as the lead department. That is, the majority of the cost account work units are accomplished within the assigned department. Information is displayed in a month-to-date and year-to-date format as illustrated in Table 3. [Ref. 7:p. 4]

d. Report of Programs

This report shows labor cost, non-labor cost (designated N-LABOR in the hard copy report), total cost and a rate for each program. The costs and rates are broken out for each contributing department. Departments are identified by a three digit numeric code under the column labeled CODE. The report also shows the total number of work units completed for each program. Information is shown in a month-to-date and year-to-date format as illustrated in Table 4. [Ref. 7:p. 3]

e. Production Rate Report

This report allows the Program Manager to monitor how well a particular department or division is achieving its assigned rate. For any requested department, the negotiated (projected) productive unit rate, the actual productive unit rate and their differences are shown for each division within the department. [Ref. 7:pp. 4-5] Table 5 is a production rate report for the physical distribution operation. The

TABLE 3

REPORT OF COST ACCOUNTS

05/21/86

COST ACCOUNT ROLL-UP SYSTEM
REPORT OF COST ACCOUNTS AS OF 04/30/86
CODE 100 - INV CONTROL DEPT

CARU031

		MONTH-TO-DATE					YEAR-TO-DATE						
NUMBER	TITLE	LABOR COST	RATE	NON LABOR	RATE	TOTAL COST	UNITS	LABOR COST	RATE	NON LABOR	RATE	TOTAL COST	UNIT
A52120	ISSUING OP	46407.80				46407.80		297136.32				297136.32	
A52124	SHIPPING D	6203.73				6203.73		45858.54				45858.54	
A5212B	MISSION RE	21072.91		56609.06-		35536.15-		80309.04		206076.19		286385.23	
A52130	STORAGE OP	16394.05				16394.05		138456.49				138456.49	
A52140	REPAIRABLE	33239.81	2.15			33239.81	15384	243675.20	2.71			243675.20	8985
A52170	REQUIREMEN	112403.21	1.11	14421.19-	.14	97982.02	100632	711403.36	1.25	21959.12	.03	733362.48	56651
D11A00	COMMAND AN	13377.44				13377.44		104191.34				104191.34	
D11D6X	TRAINING	6237.80				6237.80		74767.79				74767.79	
D11FF1	ADMIN REIM			1036.41		1036.41				7101.98		7101.98	
D11R20	SEVERANCE												
D11R70	RETROACTIV												
D11RH0	ANNUAL LEA	16370.57				16370.57		116783.82				116783.82	
D11RH1	SICK LEAVE	9503.06				9503.06		67225.23				67225.23	
D11RJ0	TERMINAL L							12249.74				12249.74	
D11RK0	HOLIDAY LE							70173.00				70173.00	
D11RL0	ADMINISTRA	1003.03				1003.03		4623.53				4623.53	
D11RM0	COMPENSATO	63.74				63.74		2208.32				2208.32	
D11RV0	TRAUMATIC							1004.34				1004.34	
O1LWOP	LEAVE WITH												
L76510	TRANS EQUI									2000.00		2000.00	
LA6AAA	COMMUNICAT			200.84		200.84				1258.96		1258.96	
M17410	GROUNDS MA												
N18350	PURCHASED									2500.00		2500.00	
P19230	REFUSE AND												
P192E0	CUSTODIAL												
	TOTALS	282277.15		69793.00-		212484.15	116016	1970066.06		240898.25		2210962.31	65637

Source: Ref. 7

TABLE 4

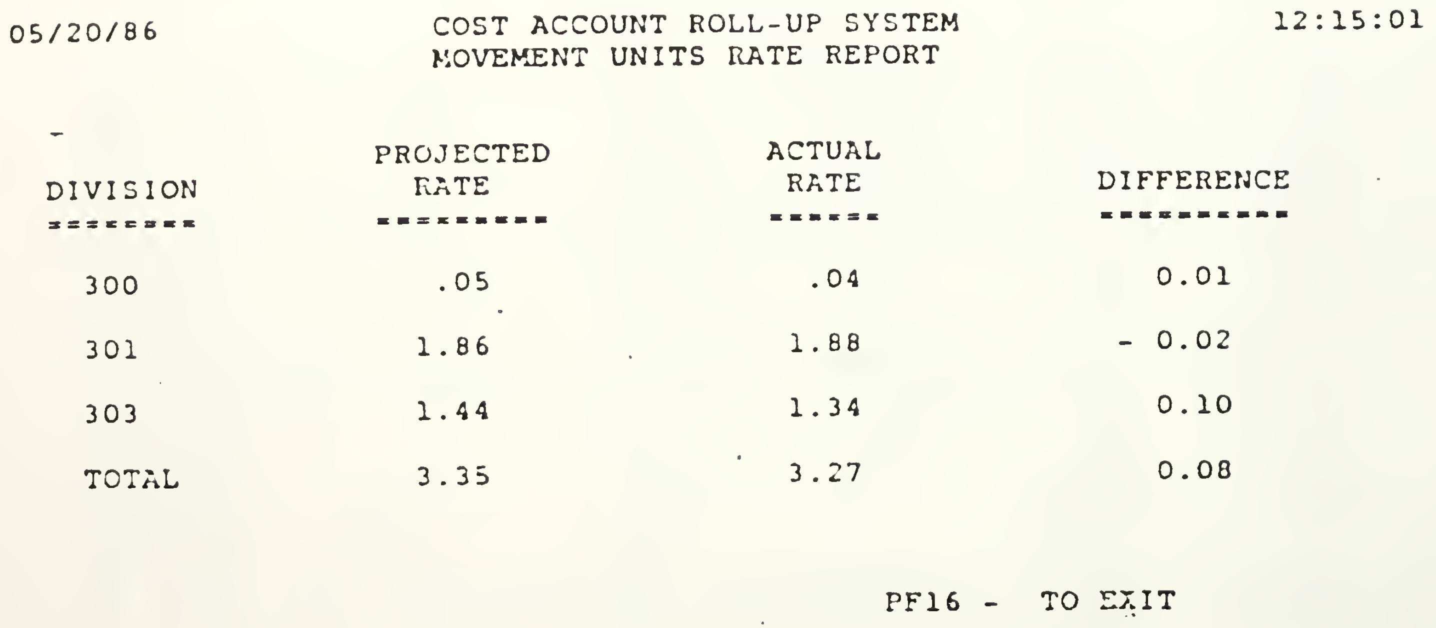
REPORT OF PROGRAMS

```
        05/20/86                                  COST ACCOUNT ROLL-UP SYSTEM                                              CARU030
                                                 REPORT OF PROGRAMS  FOR 04/30/88

     MONTH-TO-DATE                                                      YEAR-TO-DATE
COOELABOR COST      RATE  N-LABOR COST  RATE    TOTAL COST    RATE    LABOR COST      RATE    N-LABOR COST  RATE     TOTAL COST    RATE
**************** ****** ************* ****** ************* ****** ************** ****** ************** ****** ************** ******

           01     PHYSICAL DISTRIBUTION       167,056 WORK UNITS                           918,806 WORK UNITS
      1,069 411 05    8 40   323,882.73   1.93 1,393,293 78   8.34  7,264,434 69    7 90  1,256,840 93    1.36  8,521,275 52    9 27
040     108,148 53     .64       450.05          108,598.58    .65    731,312 85     .79      2,521.12            733.833 97      79
100     214,648 60    1.28    14,421.19-   .08   200,227.41   1.19  1,438,529 91    1.56     23,959 12     .02  1,460 489.03    1 58
300     453,040 43    2.71    61,301 22    .36   514,341.65   3.07  3,027,297 89    3.29    388,080 51     .42  3.415.378 40    3 71
400     293,573 49    1.75   278,552.65   1.65   570,126.14   3.41  2,066,236.09    2.24    842,362 26     .91  2,908,598 35    3.16

           02     DATA PROCESSING                 0 WORK UNITS                                 0 WORK UNITS
        263,299 53           501,217.95          764,517.48         1,698,216.12            1,291,630 83          2,987,846 95
060     263,299 53           501,217.95          764,517.48         1,695,741.25            1,291,630 83          2,987,372 08

           03     ACCOUNTING                      0 WORK UNITS                                 0 WORK UNITS
        154,069 75               91.58-          153,978 17         1,004,812 93                  445.46-         1.004,367 47
050     154,069.75               91.58-          153,978.17         1,004,265 70                  445.46-         1,003,820 24

           04     PROCUREMENT - LRGE CONTR      119 WORK UNITS                             1,045 WORK UNITS
        132,688 29 1115.02    36,947.13  310.48  169,635 42 1425.50   858,098 33  821.14    184,314 46  176 37  1,042.412 79  997 52
200     132,688.29  115.02    36,947.13  310 48  169,635.42  425.50   858,098 33  821.14    184,314 46  176.37  1,042.412 79  997 52

           05     CCPO                            0 WORK UNITS                                 0 WORK UNITS
         90.645.72             2.580.17           93,225 89           604,116 52                9.043 53            613,160 05
020      90.645.72             2.580.17           93,225.89           603,761 20                9.043 53            612.804 73

           06     REIMBURSABLES                   0 WORK UNITS                                 0 WORK UNITS
        267,753 22           131,224 88          398.978.10         1,608,994 94            2.420.010 16          4.029,005 10
000       6.823 28           233,024.20          239.847 48            33.804 00              248.623 07            282 427 07
020       4.230.50                                 4.230 50            24,032 66                7.697 14             31.729 80
040                           98,797.88-          98,797 88-              722 50            1,240.890 04          1.241.612 54
050       2.607 51             6.531.57            9.139 08            50.567 63               26.066 50             76 634 13
060      18.373 30             8,815 86           27,189.18           165,594 64              223.164 39            388.759 03
100      27.522 48            55.371 81-          27,849 33-          136,629 85              216.937 13            353.566 98
200      75.667 05            11,725 40           87.392 45           512,728 17              112.204 36            624 932 53
300      93.422 82            13,388.79          106,811 61           494,740 76              187.039 61            681.780 37
400      31,082 61             7,771 70           38,854.31           157,783 27               31.977.14            189,760 41
700       8,023 67             4,137.05           12,160.72            32,391 46               74 410 78            106 802 24

           07     OVERHEAD                        0 WORK UNITS                                 0 WORK UNITS
        402 458 51           430.218 74          832,677.25         2.765.980 70            2,306 449 99          5.072.430 69
000      76,992 22             2,597 07           79,589 29           513,073 22               44.602 61            557 675 83
020       1.132 75             1.168 66            2.301 41             3,386 31               11.991 28             15 377 59
040      90.982 21           386.639 05          477,621 26           583,042.08            2.001.488 58          2.584.530 66
050      79 469 64            15.637 73           95,107.37           533,666 37               53,784 78            587.451 15
060       3.668 05             5,100.00-           1,431 95-           36.627 44               14.481 60             51.109 04
100      19 615 24                                19,815 24           179,506 13               10.381 53            189 887 66
200      33.553 03               188.70           33,741 73           201,061 42               44.194 19            245.255 61
300       7 638 44                                 7,638 44            51,488 68                9.111 02             60.599 70
400      61 325 21            27.108 60           88.433.81           418,723 49               81.234 62            499.958 11
700      28.081 72             1,978 93           30.060 65           245,405 56                6.109 78            251,515 34

           08     PROCURTMENT - SMALL PURC    5,312 WORK UNITS                            37,332 WORK UNITS
        125,279 10   23 58                       125,279.10  23.58    821,701 83  24 65                             821,701 83    24 65
200     125,279 10   23 58                       125,279 10  23.88    821,096 41  24 63                             821,096 41    24 63
```

Source: Ref. 7

TABLE 5

MOVEMENT UNITS RATE REPORT



```
05/20/86          COST ACCOUNT ROLL-UP SYSTEM              12:15:01
                  MOVEMENT UNITS RATE REPORT

                  PROJECTED          ACTUAL
DIVISION            RATE              RATE         DIFFERENCE
========          =========          ======        ==========

   300               .05               .04            0.01

   301              1.86              1.88          - 0.02

   303              1.44              1.34            0.10

   TOTAL            3.35              3.27            0.08


                                PF16 -  TO EXIT
```

Source: Ref. 7

program work unit is called a movement unit and is defined as a line item moved, whether it be an issue, receipt, etc.

3. Quality Control

Checks and balances are built into the system in an effort to minimize input errors. Additionally, data already input into the system can be reviewed for accuracy and completeness. If errors are detected during the review, changes can be made.

a. Input Quality Control

The following checks are built into the system to preclude gross errors by the timekeeper during input:

(1) Job order numbers assigned to one department cannot be used by an employee from another department.

(2) The system will not accept more than eight hours of regular labor per employee for any one day.

(3) The correct labor code must be used for the job order number entered or the data will not be accepted.

(4) If an employee works against a standard a particular labor code must be used with the job order number. This unique labor code requires entering a standard code and work units or the data will not be accepted. [Ref. 7:pp. 5-6]

b. Review of Data Entered

There are two features which will allow the Program Manager or authorized representative to review data entered. The first feature, List Pay Period Records, displays data entered for the pay period for individual employees as discussed in subparagraph 1.a above. This feature also shows the engineered standard and hours earned for each employee.

The second feature, Dept/Div - number of Employees - Per Day, allows the Program Manager to ensure that all staff codes/departments have entered labor data for all their employees. All fourteen days of the pay period requested are displayed with the following information:

(1) Departments listed numerically with their divisions also listed numerically.

(2) Number of active employees assigned to each division.

(3) For each day, the number of employees whose data have been entered. [Ref. 7:pp. 4-6]

4. Reconciliation

Reconciliation is a feature which ensures that the labor hours expended and associated costs agree with the activity's payroll (the payroll is assumed to be correct). CARU data are balanced to the gross pay tape (automated pay record data) and exceptions are provided on hard copy for correction by the applicable departments. After corrections are made, a second and final reconciliation is made to ensure CARU data agree with the gross pay tape. At NSC Charleston the reconciliation function is performed by Code 54.

5. Uniform Management Report (UMR)

The primary purpose of the UMR is to provide management information to NAVSUP monthly. CARU provides a simplified version of the UMR. The report can be requested for display on the CRT screen or in hard copy.

The original version of the UMR, before CARU, was produced in two formats, by program (cost center) and by cost account (summary report). The cost account report was forwarded to NAVSUP and the program report was retained at the field activity for local use. Near year end, a typical program report might consist of two volumes of 700 or more pages each. The summary report might consist of 500 or more pages. The simplified version now consists of from 30 to 50 pages. [Ref. 4] It comes in three formats, by program, by cost account within a program, and in an executive summary format as illustrated in Tables 6, 7, and 8, respectively. Each report is in a format that is conducive to management under PURS. That is, information is displayed in a manner which shows the number of work units completed, the actual rate achieved (cost per unit), and the net O&M,N labor and non-labor dollars spent, after deduction of reimbursable amounts. The report also shows prior year data for comparison purposes. [Ref. 7:p. 7]

The simplified UMR also contains sections which provide a cost summary and quality statistics. The Cost Summary is illustrated in Table 9. It shows the breakdown (regular labor, overtime, etc.) of total costs for all programs, with a separate colunm for reimbursables. Costs are shown by month, quarter, mid-year, and year-to-date. The Quality Indicator Data section is illustrated in Table 10. It provides a monthly breakdown for each cost account of

TABLE 6

UMR REPORT - PROGRAM COST DATA

UMR REPORT - NSC CHARLESTON
MONTHLY REPORT

PROGRAM NAME : PHYSICAL DISTRIBUTION

MONTH	PROGRAM COST DATA O&MN REGULAR LABOR	O&MN OT LABOR	O&MN NON-LABOR	TOTAL O&MN	COST PER UNIT	PROGRAM WORK UNIT DATA WORK UNIT	PRIOR YEAR
OCTOBER	1,232,598.67	31,079.96	292,093.94	1,555,722.57	10.66	145,906	
NOVEMBER	985,994 11	9,845.27	310,528.59	1,306,367.97	10.89	119,880	
DECEMBER	955,093.45	6,791.39	80,145.83-	881,739.01	8.15	108,072	
1ST QRTR	3,173,686.23	47,666.62	522,476.70	3,743,829.55	10.01	373,858	
JANUARY	1,035,599.41	1,599.37	215,051.29	1,252,250.07	9.20	136,001	
FEBRUARY	936,006.76	2,193.52	166,987.83	1,105,188.11	9.77	113,014	
MARCH	997,504.33	767.40	28,442.28	1,026,714.01	7.96	128,877	
2ND QRTR	2,969,110.50	4,560.29	410,481.40	3,384,152.19	8.95	377,892	
1ST-HALF	6,142,796.73	52,226.91	932,958.10	7,127,981.74	9.48	751,750	
APRIL	1,054,837.77	14,573.28	323,882.73	1,393,293.78	8.34	167,056	
MAY							
JUNE							
3RD QRTR	1,054,837.77	14,573.28	323,882.73	1,393,293.78	8.34	167,056	
JULY							
AUGUST							
SEPTEMBER							
4TH QRTR							
2ND HALF	1,054,837.77	14,573.28	323,882.73	1,393,293.78	8.34	167,056	
YTD DATA	7,197,634.50	66,800.19	1,256,840.83	8,521,275.82	9.27	918,806	1,595,594
PRIOR YR				14,739,818.00	9.23	1,595,594	

Source: Ref. 7

TABLE 7

UMR REPORT _ PROGRAM COST ACCOUNT DATA

UMR REPORT NSC CHARLESTON
MONTHLY REPORT

PROGRAM NAME : PHYSICAL DISTRIBUTION

PROGRAM COST ACCOUNT DATA

MONTH	COST ACCOUNT	TITLE	WORK UNITS	HOURS	PR	O&MN REGULAR LABOR	O&MN OT LABOR	O&MN NON-LABOR	TOTAL O&MN
OCT	A52110	RECEIVING OPERATION	40.430	32.549 00	1.24	298,775 44	6.888 43	39.509 25	345.173 12
	A52120	ISSUING OPERATIONS	105,680	15.384.25	6.86	148.236 56	1.818 37	74,892.93	224.947 86
	A52121	PACKING OPERATIONS	246.605	15.922 00	15.48	165.003 78	4 027 69		169.031 47
	A52124	SHIPPING OPERATIONS	4,712	8.536 00	.55	83.861.09	2,451 62		86.312 71
	A52128	MISSION REIMBURSABL							
	A52130	STORAGE OPERATIONS		26,148 00		289.374 81	12,792 98	99,101.37	381,269 16
	A52134	PHYSICAL INV OPS	70,528	10.004.00	7.04	107,524.33			107,524 33
	A52140	REPAIRABLES MGMT	12,447	3,854 50	3.22	50,572.56			50,572.56
	A52160	CONTAINER CARGO OPS	452	12 00	37.66	144 45			144.45
	A52170	REQUIREMENTS DETERM	85,910	9.302 75	9.34	109,105.65	3,050.87	7,790 39	119.946 91
	L76610	TRANS EQUIP RENTAL						70,800.00	70,800 00
NOV	A52110	RECEIVING OPERATION	34.482	26.954.93	1.27	248.082 94	5,114.90	5,384 48	258,582 32
	A52120	ISSUING OPERATIONS	85.528	13,175.50	6 49	133,221.31	621.57	102,299 55	236,142 43
	A52121	PACKING OPERATIONS	404,332	10,465 25	38.63	103,848 61	1,598 08		105,444.69
	A52124	SHIPPING OPERATIONS	3,994	6,814 25	58	66,907.13	281 78		67,188 91
	A52128	MISSION REIMBURSABL							
	A52130	STORAGE OPERATIONS		18,961 75		214,478 34	1,704.58	203,910 52	420,093 42
	A52136	PHYSICAL INV OPS	74,741	7,801 00	9 58	85,815.33		1,143.99	86,965 32
	A52140	REPAIRABLES MGMT	9,143	2,996 00	3 05	39,400.51			39,400 51
	A52160	CONTAINER CARGO OPS	661	73 00	9 05	892 74			892 74
	A52170	REQUIREMENTS DETERM	68,123	7,711 17	8 83	93,349.20	524.38	3,784 05	97,657 63
	L76610	TRANS EQUIP RENTAL						6,000.00-	6,000 00-
DEC	A52110	RECEIVING OPERATION	34 976	25,852 50	1 35	242,058.61	1,810.00	4,062 59	247,931 20
	A52120	ISSUING OPERATIONS	73,215	11,601 75	6.31	120,796 20	785 74	106,741.50-	14,840 44
	A52121	PACKING OPERATIONS	336.434	8,753 50	38 43	88 681 14	355 07		89,036 21
	A52124	SHIPPING OPERATIONS	3,297	6,601 00	.49	67,835.64	124 91		67,960 55
	A52128	MISSION REIMBURSABL							
	A52130	STORAGE OPERATIONS		18,347 50		215,371.81	1,518 52	19,248.90	236,139.03
	A52136	PHYSICAL INV OPS	59,246	8,596 50	6 89	91,088 03		454 77	91,542 80
	A52140	REPAIRABLES MGMT	9,328	3,372 50	2 76	43,960 42	2,197.15		46,157 57
	A52160	CONTAINER CARGO OPS	391	33 00	11 84	407 55			407 55

Source: Ref. 7

TABLE 8

UMR EXECUTIVE SUMMARY

NEW UMR EXECUTIVE SUMMARY - MONTH : APRIL 86

I. PROGRAM	CURRENT MONTH			YEAR TO DATE			PRIOR YEAR		
	WORK UNITS	NET	COST PER UNIT	WORK UNITS	NET	COST PER UNIT	WORK UNIT	NET	COST PER UNIT
PHYSICAL DISTRIBUTION	167,056	1,393,293.78	8.34	918,806	8,521,275.52	9.27	1,595,594	14,739,516.00	9.23
DATA PROCESSING		764,517.48			2,987,846.95				
ACCOUNTING		153,978.17			1,004,367.47				
PROCUREMENT - LRGE CONTR	119	123,133.42	34.73	1,045	995,910.79	953.02			
CCPD		93,225.89			613,160.05				
OVERHEAD		832,677.25			5,072,330.69				
PROCUREMENT - SMALL PURC	5,312	125,279.10	23.58	33,332	821,701.83	24.65			
NET TOTAL OF OM&N		3,486,105.09			20,016,593.30				
REIMBURSABLES		445,480.10			4,075,507.10				
GROSS TOTAL		3,931,585.19			24,092,100.40				

II. PRODUCTIVITY INCREASE/DECREASE OVER PRIOR YEAR .99

Source: Ref. 7

TABLE 9

UMR - COST SUMMARY

COST SUMMARY OF ALL PROGRAMS AND COST ACCOUNTS:

MONTH	REGULAR LABOR	O.T. LABOR	O&MN LABOR	NON-LABOR	TOTAL O&MN	REIMBURSABLES
OCTOBER	2,595,220.59	76,284.71	2,671,505.30	1,327,323.22	3,998,828.52	292,671.55
NOVEMBER	2,188,694.72	58,027.80	2,246,722.52	1,676,419.35	3,923,141.87	1,384,102.62
DECEMBER	2,176,046.59	26,149.98	2,202,196.57	295,430.50	2,497,627.07	452,931.41
1ST QRTR	6,959,961.90	160,462.49	7,120,424.39	3,299,173.07	10,419,597.46	2,129,705.58
JANUARY	2,418,930.60	22,229.88	2,441,160.48	1,049,675.81	3,490,836.29	565,367.80
FEBRUARY	2,167,154.44	19,565.39	2,186,719.83	1,125,368.84	3,312,088.67	587,678.28
MARCH	2,357,607.83	12,738.36	2,370,346.19	567,646.60	2,937,992.79	347,275.34
2ND QRTR	6,943,692 87	54,533.63	6,998,226.50	2,742,691.25	9,740,917.75	1,500,321.42
1ST-HALF	13,903,654.77	214,996.12	14,118,650.89	6,041,864.32	20,160,515.21	3,630,027.00
APRIL	2,477,080.89	28,524.28	2,505,605.17	1,425,980.02	3,931,585.19	445,480.10
MAY						
JUNE						
3RD QRTR	2,477,080.89	28,524.28	2,505,605.17	1,425,980.02	3,931,585.19	445,480.10
JULY						
AUGUST						
SEPTEMBER						
4TH QRTR						
2ND HALF	2,477,080.89	28,524.28	2,505,605.17	1,425,980.02	3,931,585.19	445,480.10
YTD DATA	16,380,735 66	243,520.40	16,624,256.06	7,467,844.34	24,092,100.40	4,075,507.10
PRIOR YR						

Source: Ref. 7

TABLE 10

UMR _ QUALITY INDICATOR DATA

QUALITY INDICATOR DATA

MONTH	COST ACCOUNT	TITLE	OC ERRORS	AS % WORK UNITS
OCTOBER	A52110	RECEIVING OPERATIONS	4	.80
	A52120	ISSUING OPERATIONS	3	.60
NOVEMBER	A52110	RECEIVING OPERATIONS	4	.80
	A52120	ISSUING OPERATIONS	5	1.00
DECEMBER	A52110	RECEIVING OPERATIONS	2	.50
	A52120	ISSUING OPERATIONS	3	.60
JANUARY	A52110	RECEIVING OPERATIONS	1	.20
	A52120	ISSUING OPERATIONS	5	1.00
FEBRUARY	A52110	RECEIVING OPERATIONS	24	1 00
	A52120	ISSUING OPERATIONS	24	.60
MARCH	A52110	RECEIVING OPERATIONS	15	.70
	A52120	ISSUING OPERATIONS	30	.70
APRIL	A52110	RECEIVING OPERATIONS		
	A52120	ISSUING OPERATIONS		
MAY	A52110	RECEIVING OPERATIONS		
	A52120	ISSUING OPERATIONS		
JUNE	A52110	RECEIVING OPERATIONS		
	A52120	ISSUING OPERATIONS		
JULY	A52110	RECEIVING OPERATIONS		
	A52120	ISSUING OPERATIONS		
AUGUST	A52110	RECEIVING OPERATIONS		
	A52120	ISSUING OPERATIONS		
SEPTEMBER	A52110	RECEIVING OPERATIONS		
	A52120	ISSUING OPERATIONS		
YTD DATA	A52110	RECEIVING OPERATIONS	50	.80
	A52120	ISSUING OPERATIONS	70	70

Source: Ref. 7

quality control errors and the error rate as a percentage of work units. This information is shown for each month and year-to-date. [Ref. 7:p. 7]

6. System Security

CARU can only be accessed by individual employees who are assigned a unique password. Once in CARU, access to certain information is also limited by password. For instance, a timekeeper in one department cannot access data pertaining to a different department. There are also certain functions, such as transfer of costs from one job order to another, that can only be performed by a limited number of individuals. [Ref. 7:pp. 7-8]

C. SYSTEM HARDWARE

In developing CARU, the originator had three choices of computer systems with which to work. The Burroughs system was the mainframe computer, whose use would have to be scheduled through the ADP Department. The Wang system was more a word processing system and was already integrated into the Office Automation System. Each department had at least one terminal and was familiar with its use. The Tandem system was onboard, but very new. The ADP staff was in the process of being trained in its use.

Any of the three systems was adequate to handle CARU initially. However, since there was no in-house programming expertise for the Tandem system and the Burroughs system was bogged down with current applications, the Wang system was chosen for developing the CARU prototye. After making the decision to use the Wang system, the major problems in developing CARU were (1) the short timeframe allowed to develop the system, (2) programming limitations inherent in the Wang system, and (3) determining what features were desired by management. [Ref. 12]

The CARU software has been revised for utilization on the Tandem Computer System since Tandem is now common to the majority of the NAVSUP field activities.

D. SUMMARY

CARU's principal function is to provide an automated means of recording labor distribution and employee productivity data on a daily basis. These and other input data are then synthesized to provide (on a real-time basis) all levels of management with information essential to effective management. A description of data entry and system output are provided to assist the reader in understanding how CARU operates. Security features are built into the system to limit access to sensitive data and to protect the validity of input data.

IV. AN ASSESSMENT OF THE SYSTEM

As stated in the introduction, the purpose of this study is to assess CARU's effectiveness as an information system. The system is evaluated by using Krauss' seven criteria discussed in the second chapter. Those seven criteria are relevance, user responsiveness, accessibility, dependability, security, accuracy, and efficiency. In evaluating CARU, the study also answers the four research questions:

1. How does CARU perform relative to its stated objectives?
2. How is CARU evaluated by its major users?
3. What shortcomings were identified in the system?
4. What is the feasibility of making CARU available to other commands and of expanding its applications to meet other needs?

A. INTERVIEWS OF MAJOR CARU USERS

The biggest problem encountered in evaluating CARU was the lack of data available on its use. The system prototype had been in operation for about a year at the time the study began and was in the process of being reprogrammed to operate on the Tandem Computer System. The methodology chosen to gather information on the system was to observe CARU in operation and to interview its users.

Interviews were conducted at NSC Charleston with the Comptroller, Deputy Comptroller and Director, Methods Engineering Division, all of whom were deeply involved in the development of CARU. The Comptroller Department is the major user and the authority on CARU. Also interviewed at NSC Charleston were the Deputy Director of the Freight Terminal Department, the Acting Director of the Material Department, members of the CARU programming team from the ADP Department and a timekeeper from the Receiving Division of the Material Department. The results of on-site observations and interviews were synthesized to address the questions raised in paragraphs B through H below.

B. RELEVANCE

In determining relevance, the questions to ask are whether the system addresses the problems at hand and if it will assist the user in meeting stated objectives. During interviews, the consensus of the users of the system was that CARU has been fairly successful in meeting its objectives. According to the CARU Project Manager, those objectives were formulated to meet the needs of NSC field activities, to address the problems at hand. [Ref. 6] Those objectives, briefly stated, are as follow:

- Provide information to managers which will allow them to effectively manage resources under PURS.
- Allow managers to monitor individual and group productivity and quality performance.

- -Provide a system flexible enough to accommodate different management styles.
- -Influence headquarters toward macro rather than micro management of field activities. [Ref. 6]

1. Managing Resources Under Purs

CARU output is displayed in a rate format to facilitate management under PURS. That is, information is shown in terms of rates and work units, those elements deemed important by NAVSUP. The system provides the tools necessary for the manager to perform the functions required under PURS, functions such as the following:

- -tracking planned versus actual workload;
- -tracking planned versus actual rates;
- -extrapolating future workload;
- -monitoring quality indicators;
- -monitoring overhead costs; and
- -interfacing with the comptroller concerning proposed rates. [Ref. 5:p. 7]

Costs are broken out by labor and non-labor elements, reimbursables and overhead are separated from direct costs. Output is formatted to show the number of work units completed, which allows the manager to see what the actual workload is for comparison with the planned workload. Managers have access to information on a daily basis, in time to react to cost and workload surges. [Ref. 2] In the UMR, quality control and cost summary data are shown in a format (for every month, quarter, etc.) which assists in the spotting of trends. Prior year data are also provided.

In actual use of the system, the following physical distribution information is extracted via CRT for cost planning information: work units, direct labor costs and rate (cost per work unit) for the day, month and year-to-date. Year-to-date direct non labor costs and year-to-date cumulative cost per work unit are also extracted. In addition, daily, monthly, and year-to-date reimbursable and "other" costs are extracted. This information is used to analyze labor cost per division, intermittent labor costs, overtime expenditures, etc. These resulting figures are used to make the decisions necessary to reach or stay within the target or negotiated rates. This information was used to make decisions on how to move people on the basis of workload when funding was cut in June, 1986. [Ref. 13]

2. Monitoring Individual and Group Performance

Individual and group production information are provided to give the manager increased cognizance over his/her unit's performance. Quality information is provided in the UMR on a monthly basis. The ultimate goal of CARU is to have productivity and quality data in a side-by-side format from the individual level on up to the activity level. That way, to manager will be able to see how productively and how effectively an employee or division is performing.

Productivity information is currently being used by some managers as an input to the Basic Performance Appraisal System used to evaluate Department of Defense civilian personnel. Supervisors have used the information to substantiate individual evaluations, to assist in decision-making about performance awards and to initiate training in cases of deficient performance.

3. Accomodation of Different Management Styles

CARU allows managers to input labor data daily, weekly, or bi-weekly, according to the needs of the activity. It provides information in a variety of formats. At the headquarters level, reports are provided at the cost account, program, and activity level. At the activity level, information is available at the individual, branch, division, job order, cost account and program levels. Each manager is free to choose the format which meets his/her needs.

One factor that was very evident during the research effort is that difrent managers use the system for different things. Some managers pull data from the CRT daily. Other managers are satisfied to review periodic hard copy reports. Some managers look at cost data exclusively. Other managers are more interested in using individual productivity data to spot trends and abberations in employee performance. [Refs. 13, 14]

4. Influencing Headquarters Toward Macro Management

This objective is achieved through the new, simplified UMR produced by CARU. The previous UMR provided NAVSUP with much more detailed information than was necessary for management at the headquarters level. Hence, NAVSUP was prone to ask questions and provide guidance on field activity level concerns. [Ref. 6]

Originally, the UMR was prepared in a cost account format. There was a Cost Center (program) Report and a Summary Report. The Cost Center Report normally consisted of two volumes of over 700 pages each. There was a section for each program which contributed to a cost account, and this was done for each of the 500 cost accounts. The Cost Center Report was retained at the activity level for local use. The Summary Report summarized all information at the cost account level with a section for each cost account. This report could consist of over 500 pages by year end. It was forwarded to NAVSUP via microfiche. [Ref. 4]

Shielding unnecessary detail from NAVSUP has been achieved through a reduction in the number of operational cost accounts used by NSC Charleston from 500 to 45. The number of job orders was also dramatically reduced from 2000 to 200 by changing from organizational job orders to showing just three job orders per cost account - direct labor, indirect labor and non-labor. The Supply Center is no longer divided into minute functional areas by a myriad of cost accounts, and the information received by NAVSUP is summarized at higher levels of activity. The simplified UMR focuses more on providing information at the program level. NAVSUP gets a short, readable UMR in rate format at program and cost account level. Micro data are available at the field level if required. [Ref. 4]

C. USER RESPONSIVENESS

The key considerations under user responsiveness are system flexibility and the ease with which users can implement changes to the system. Since CARU was still in the prototype stage during it's evaluation, it was very easy to obtain changes to the system. In fact, recommendations for system changes were actively solicited by the project manager. CARU was being reprogrammed for use on the Tandem Computer System in order to make it available to other NAVSUP field activities. A lot of effort went into generalizing the system to make it more universal. [Ref. 12]

The flexibility of the system is evident in its versatilty and the many different levels at which information can be retrieved. CARU was designed to meet the needs of managers at different levels of the organization and to offer different options to managers at all levels, a factor which should make frequent changes unnecessary.

However, it was disappointing to find that CARU was not being fully utilized by lower level managers. While perhaps not applicable at the first level of supervision, CARU can benefit managers from the branch level on up in managing budget and workforce. If CARU is not used at the lower levels, it will probably not be supported at the lower levels. Without the support of lower level management the validity of input data will suffer.

D. ACCESSIBILITY

Accessiblitity deals with how easy the system is to use. This is one of the most important considerations of the seven criteria listed. If the system makes it difficult to access information or is not convenient to the user, the odds are that it won't be utilized. If the information is already two weeks old upon receipt, the chances are that it won't be looked at.

Each interviewee was generally pleased with how easy the system is to access and the ready availability of information via the CRT screen. The Wang Computer System was chosen originally because terminals were located in every major office space. CARU is also more accessible in terms of the lesser volume of information in the UMR reports. Cost accounts were reduced from 500 to 45. The number of job orders were reduced from 2000 to 200.

E. DEPENDABILITY

Dependability deals with whether the system performs as specified and if it actually works most of the time. As discussed in paragraph B above CARU does perform as specified. Interviewees had no complaints about downtime of the computer. The only respect in which the system failed is in being a real-time information system. Access to labor cost data is normally a day behind, and non-labor is downloaded to CARU three times a week.

F. SECURITY

Security features are built into the system by use of passwords. Access to certain information is strictly limited to those with a need to work with that information. There are also certain functions, such as transferring costs from one job order to another and reconciliation of data, that can be performed by only a few authorized personnel. These features are built in to protect the integrity of the data entered and limit access to sensitive information. [Ref. 7:pp. 7-8]

G. ACCURACY

Is the output precise enough for its intended use? CARU output provides both financial and productivity data. Interviewees were satisfied with the accuracy of financial information but expressed some concern over productivity (production effectiveness) information. These concerns are described below.

The greatest emphasis is placed upon the accuracy and timeliness of financial data. Labor cost data are reconciled to payroll data. Payroll data are considered accurate because of strict procedures, checks and balances controlling payroll. Non-labor is downloaded into CARU three times a week with each journal voucher from an existing financial data base. [Ref. 2] The only drawback identified was that labor data are only validated against payroll data once every two weeks (when payroll is processed). NSC Charleston has experienced an error rate of less than one percent in reconciling labor distribution to gross pay data.

Productivity information is derived by applying engineered standards to the number of work units accomplished and the number of hours worked. The necessary assumptions here are that the engineered standards are correct and that supervisors are meticulous about recording actual employee performance. However, there are no controls in place to ensure that first line supervisors are keeping track of employee performance and recording it properly. As pointed out by one interviewee, it is important not to record that employee A was making issues when employee A was actually sweeping the floor for 45 minutes. [Ref. 14] During on-site observation, productivity figures ranging from 40% to 800% were observed. Productivity figures were, however, fairly consistent within a specific work place, such as a warehouse.

H. EFFICIENCY

The criteria of efficiency deals with whether operating costs are reasonable. Operating costs consist of timekeeper salaries, training in the use of the system, purchase and maintanance of Tandem terminals.

NSC Charleston did not require any additional personnel or other resources for operating CARU. The average input time by timekeepers for the Material Department (300 employees/two timekeepers) was two hours per day on the Wang System. Training has been accomplished in-house. [Ref. 7:p. 8]

CARU has been reprogrammed to operate on the Tandem Computer System. This system is common to most NAVSUP field activities. Data can be entered from any terminal which is compatible with the Tandem system. Therefore, existing terminals can be utilized for CARU, as long as they are compatible. [Ref. 4] The most significant out-of-pocket costs incurred would be the cost of installing additional terminals where necessary. This cost might qualify for funding by NAVSUP as a productivity initiative.

I. SUMMARY

CARU has many uses and is used for different reasons by different managers. Its primary use so far has been to provide information for the decision-making required to reach or stay within the negotiated rate (under PURS). It also has other possible applications which will be discussed in the next chapter. Among its many features are daily labor distribution, daily recording of work units, shielding of unnecessary detail from NAVSUP, individual productivity standards, less volume and provision of data in various formats. Some managers take advantage of many of the key features while others utilize only a few.

While CARU overwhelmingly meets the criteria of an effective information system, it also has its shortcomings. The system does not yet provide the quality control information which will aid supervisors in knowing how accurate individual employees and the branch or division are. The use of productivity information is limited because engineered standards have not been purified. That is, the engineered standards are not uniform enough to provide consistent productivity information from one organizational unit to another. (Personnel in warehouse A cannot be rated against personnel in warehouse B on the basis of productivity information). Additionally, there are few controls in place to ensure that actual employee performance is being recorded properly.

V. OTHER APPLICATIONS

There are several possible enhancements to CARU. Some are planned for the near future. Others will require considerable reprogramming. One enhancement planned for the near future will show quality (rate of accuracy) and productivity data in a side-by-side format. A second enhancement is the inclusion of budget information. The last enhancement discussed in this study is the incorporation of time and attendance data for payroll purposes.

The side-by-side quality and productivity information implies that quality control and productivity information will be displayed in adjacent columns in the output format. This feature will allow managers to see not only what employees are doing but also how well they are doing it and how accurate they are. The productivity data are already a part of CARU. The quality control data can be downloaded from existing quality control systems, such as the automated WIN Stamp program. For programs which are not covered by an existing quality control program, accumulation and entry of quality control data would be the responsibility of designated supervisors. [Ref. 4]

Adding budget information to CARU would involve the creation of another report (utilizing data already existing within the system) showing how much was budgeted, how much has been spent, how much is left or how much overspent. [Ref. 12] This information could be shown in terms of work units and dollars. A further expansion would be to show projected expenditures for the month, quarter, or year, based upon the current expenditures.

Incorporating time and attendance for payroll purposes would be a major step. This capability would entirely eliminate the duplication of effort now experienced in the production of payroll and in the reconciliation of payroll to labor distribution data. Incorporating payroll into CARU would involve having supervisors and payroll clerks certify labor distribution data and use it as payroll data. Some means would also have to be provided for employees to certify the correctness of their time. [Ref. 12]

VI. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

CARU is not without its shortcomings, but those shortcomings do not keep it from being effective. CARU does pass the test as an information system. It meets the seven criteria established, and it is being used for the purposes intended.

As with any system, CARU is only as good as the people who use it. The results of this study show that the system has a lot of capabilities not previously available. The capabilities offered are useful and generally are easily accessible. However, the output will only be as good as the data input. And the system will be effective only to the extent that it is used.

Currently, the first level supervisors and lower level managers responsible for recording input data are not actively using CARU. Hard copy reports are often the last thing looked at and are not being used as effectively as they could be at lower levels of management. [Ref. 14] Senior level managers are using the system however, and are happy with the results. [Refs. 12,13,14] As a support system for PURS, CARU was considered satisfactory.

B. RECOMMENDATIONS

Require the use of CARU at all NAVSUP field activities funded under PURS. This will provide a uniform data base for management reports, specifically, the UMR. The simplified UMR presents information in a format consistent with the way in which activities are funded. The system can be tailored to meet the specific needs of different activities.

Implement the side-by-side productivity and quality data feature as soon as possible. Availability of this feature will make CARU much more useful to lower level managers.

Finalize and purify engineering standards as soon as possible. It is recognized that developing engineering standards is a time consuming task, but the better the engineering standards are, the more dependable the productivity data will be. Standards should be as usable at the inter-warehouse level as they are at the intra-warehouse level.

Use plain language in developing reports as much as possible, instead of codes. This will make it easier for lower level managers to read and understand output and encourage use of the information available.

Make the support of CARU a performance element in evaluating supervisors in order to encourage them to use the system and to take more care in recording valid data.

Add budget information to CARU to assist managers in monitoring their performance against budget.

Conduct a feasibility study of the possibility of incorporating payroll as a part of CARU.

APPENDIX A

INTERVIEW QUESTIONS

Following is a list of questions that were used to structure interviews with the actual users of CARU. These questions were used as a lead-in to discussions and the order was not strictly followed. Answers were obtained during the interviews for each question listed below.

1. What kind of information do you, as a manager, want or need, from the CARU System? In what format?
2. What kinds of information do you/can you get from the system?
3. What do you use the information for?
4. What would you have the report do that it doesn't currently do? What information should be in the report that isn't?
5. How often do you receive output from the system? How often would you like to?
6. Can you get the output more often if you desire?
7. How often do you use the infomation output?
8. Is the same information available from a more easily accessed source?
9. Has the CARU System made your job easier or more difficult?
10. How much additional work has the CARU System created for you in supporting the system? In accessing the system?
11. Can you now do something because of the system that you couldn't do before?
12. Overall, is this system better or worse, from your point of view?

13. Do you feel that you have adequate information about what's in the system and how you can access the information and use it?

APPENDIX B

COST CENTERS AND ASSOCIATED PRODUCTIVE UNITS

COST CENTER/MANAGER	PRODUCTIVE UNIT	SOURCE
General & Admin (SUP 012)	Percent of Productive Resources	UMR-A Reports
Accounting:		
Material Accounting (SUP 014)	Transactions Posted	FUF 14 and GUC 68 Reports
Fund Resource Acctg (SUP 014)	Transactions Posted	Workload Reports (New)
Civilian Payroll Acctg (SUP 014)	Graded/Ungraded Pay Accounts	NAVCOMPT Form 485
Disbursing (SUP 014)	Checks Issued Invoices Processed	GUG-F6 Report UGF 4 Report
ADP (SUP 041)	Review of Cost (No Productive Unit Assigned)	Chargeback Reports Komand (ICPs) MICAB (Stock Points)
Physical Dist. (SUP 061)	Movement Unit	1144 and UA-78 Report
ATAC HUB (SUP 061)	Line Item Receipts	DOCID BCI Transactions Reported
Fuel Operations (SUP 40)	M-Barrels Pumped/ Operations	Fuel Ops Report
Personal Property (SUP 053)	Transactions (weighted)	
Provisioning: Initial & Follow-on (SUP 0312)	Line Item Reviewed	R020-SPS-SPCC Provisioning Statistical Report-PPMIS-ASO

COST CENTER/MANAGER	PRODUCTIVE UNIT	SOURCE
Program Requirement Establishment (SPCC only) (SUP 0312)	PPRs Generated	J-15:UICP-SPCC; PRR Report: Inter-Stratification Tape-ASO
Allowance Document Preparation (SUP 0312)	Allowance Document Prepared	Activity Mgmt Info Sys-SPCC; Q605CIL and ME0015 Reports PPMIS-ASO
Inventory Control (SUP 0312)	Line Items Managed	1145 Report (SPCC will perform some manual reporting)
Procurement (SUP 024)	Contract Action (Weighted) Purchase Action	DF PUR and 1057 Reports

DEFINITIONS:

ATAC HUB - Retrograde Repairables Screening and Processing Cost Center. Used to accumulate operating costs at NSC Norfolk and San Diego.

CHARGEBACK REPORT KOMAND (ICPs) - KOMAND is a software package used by inventory control points to implement a charge-back system for Resolicitation hardware and service functions.

CHARGEBACK REPORT MICAB (STOCK POINTS) - MICAB is the Management Information, Cost Accounting and Billing system developed by NSD Subic Bay to collect resource utilization data and generate billing statements. It will be implemented by supply centers for charge-backs.

DD 1057 - Report which feeds into the Program Management Reporting System actions used as the bases for computing large purchase productive units.

DF PUR - DD 1057 for small purchase actions.

DOCID BC1 TRANSACTION REPORT - Report recording the number of retrograde repairable line item receipts.

FUF 14 REPORT - The Select Stores Statistics Report which records an automated count of transactions for the Material Accounting Cost Center.

GUC 68 REPORT - The Processing Statistics Report which gives an automated count of transactions for the Material Accounting Cost Center.

GUG-F6 REPORT - A report which gives an automated count of the number of checks issued in the Disbursing Cost Center.

NAVCOMPT FORM 485 - A NAVCOMPT form which reports an automated count of the number of graded and ungraded pay accounts maintained on a validated payroll.

NAVSUP 1144 - Supply Distribution and Inventory Control Operations Report. Ref. NAVSUPINST 5520.15B.

R020-SPS-SPCC REPORT - A report which records the number of line items reviewed by the Provisioning Cost Center for SPCC.

SPCC PROVISIONING STATISTICAL REPORT-PPMIS-ASO - A report which records the number of line items reviewed by the Provisioning Cost Center for ASO.

UA-78 REPORT - Monthly report submitted to SUP 40/Navy Petroleumm Office which forms the basis of information provided to NAVSUP in the monthly PURS message report.

UGF 4 REPORT - An automated report which gives the number of invoices processed.

UMR-A REPORT - Uniform Management Report.

SOURCE: [Ref. 4]

APPENDIX C

SAMPLE COST CENTER DESCRIPTION

DISBURSING COST CENTER

1. DEFINITION. The Disbursing Cost Center will be used to fund and accumulate all measurable labor and non-labor costs identified with the disbursing function. This cost account will be used to fund the activity for performing the function for itself and all assigned customers.

2. FUNCTIONS INCLUDED. The Disbursing Cost Center is composed of the cost accounts listed below. The cost accounts have been redefined and new definitions are provided in Chapter 5 of NAVSUP Publication 285. No functions previously managed under the former functional cost accounts and function keys are provided for reference.

PUR Cost Account	Former Cost Accounts(s)	Former Key
1C4E	1C7B, C, D	14AC
1C4F	1C7A	14AC
1C4H	1C71-8	14AC

An overhead cost account (1C4X) has been established to accumulate the costs of supervision above the division level and the administrative and clerical support costs not associated with a specific function. This Cost Center will bear a pro rata share of these costs based on the percentage of its costs to total costs reported in the 1C40 series.

3. RATE DETERMINATION. This Cost Center is composed of cost accounts 1C4E, 1C4F, and 1C4H. The Disbursing Cost Center's total productive units are the automated count of the number of checks issued as reported on the GUG-F6 report (cost account 1C4E); the number of invoices processed as reported on the automated UGF4 report (cost account 1C4F); and by a manual count of the number of vouchers and payrolls examined (cost account 1C4H). This manual count will be developed using local procedures. A weighting system will recognize the complexity of the tasks associated with each function. A factor of 1 is assigned to the number of checks issued (cost account (1C4E). A factor of 2 is assigned to the number of checks invoices processed (cost account 1C4F). A factor of 1.5 is assigned for the examination of invoices and payrolls when the Central Disbursing Officer (CDO) functions (cost account 1C4H) are performed. The rate is determined by

dividing the productive units into the resources reported under the cost center as described in paragraph 2.

4. PERFORMANCE/QUALITY INDICATORS. The following indicators will be used to assess the performance of the disbursing operation and to determine if it is adequate to qualify for profit sharing:

a. Backlog of unprocessed invoices (1C4F) must not exceed 10% of the total invoices processed.

b. Backlog of vouchers and payrolls awaiting examination (1C4H) must not exceed 5% of total examined.

SOURCE: [Ref. 5]

APPENDIX D

COST ACCOUNT ROLL-UP CONFERENCE

15-16 JULY 1986

ATTENDEES

Naval Supply Center, CHARLESTON,

Naval Supply Center, NORFOLK,

Naval Supply Systems Command, WASHINGTON D. C.

Naval Supply Center, PUGET SOUND,

Naval Supply Center, PENSACOLA

Naval Supply Center, SAN DIEGO

Naval Supply Center, PEARL HARBOR

Naval Supply Center, JACKSONVILLE

Naval Regional Contracting Center, WASHINGTON D. C.

Naval Regional Contracting Center, LONG BEACH

Naval Regional Contracting Center, PHILADELPHIA

Naval Publications and Forms Center,PHILADELPHIA

FMSO MECHANICSBURG

Aviation Supply Office

Ships Parts Contol Center, MECHANICSBURG

SOURCE: [Ref. 2]

LIST OF REFERENCES

1. Commander, Naval Supply Systems Command, Washington, D.C. Message R 091632Z, Subject: Improved Financial Management Capability for the Productive Unit Resourcing System, 9 June 1986.

2. Naval Supply Center, Charleston, South Carolina Letter, Subject: 15-16 July 1986 Cost Account Rollup Briefing At NSC Charleston, 20 June 1986.

3. Naval Supply Systems Command Memorandum for the Vice Chief of Naval Operations, Subject: NAVSUPSYSCOM Resourcing Strategy, 10 June 1985.

4. Interview between David Kaskin, Naval Supply Center, Charleston, South Carolina and Joyce Jordan, Naval Postgraduate School, Monterey, California, 25 September 1986.

5. Naval Supply Systems Command Instruction 7000.21A, Subject: Productive Unit Resourcing At Naval Supply Systems Command (NAVSUP) Field Activities, SUP 0122, Washington, D. C. (Draft Copy)

6. Interview between Jim Madden, Naval Supply Center, Charleston, South Carolina and Joyce Jordan, Naval Postgraduate School, Monterey, California, 25 September 1986.

7. Naval Supply Center Charleston, Cost Account Roll-Up System Description, Charleston, South Carolina 29408-6350, 15-16 July 1986.

8. Lucas, Henry C. Jr. Information Systems Concepts for Management. New York: McGraw Hill Book Company, 1982.

9. Lucas, Henry C. Jr. Why Information Systems Fail. New York: Columbia University Press, 1975.

10. Krauss, Leonard I. Computer-Based Management Information Systems. American Management Association, Inc., 1970.

11. Interview between Helen Murphy, Naval Supply Center, Charleston, South Carolina and Joyce Jordan, Naval Postgraduate School, Monterey, California, 26 September 1986.

12. Interview between Mary Lou Hilton and Phyllis Clay, Naval Supply Center, Charleston, South Carolina and Joyce Jordan, Monterey, California, 25 September 1986.

13. Interview between Linda May, Naval Supply Center, Charleston, South Carolina and Joyce Jordan, Naval Postgraduate School, Monterey, California, 25 September 1986.

14. Interview between Commander Steven W. Maas, USN, Naval Supply Center, Charleston, South Carolina and Joyce Jordan, Naval Postgraduate School, Monterey, California, 25 September 1986.

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